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DEFINING APHASIA CAUSES: DO LANGUAGES MATTER?

At first glance the title might cause misunderstandings: do languages matter? Of course they do – analyzing is an inseparable aspect of the neurolinguistic approach. Nevertheless, digging dipper into the basic understanding of so-called «linguistic» symptoms one could also get a prejudice of strictly neurophysiological basis under any of contemporary aphasia studies. So, do languages matter?

According to the National Aphasia Association (USA), aphasia can be defined as an *impairment of language,* affecting the production or comprehension of speech and the ability to read or write. Also the most known causes of aphasia are brain injuries that may arise from head trauma, from brain tumors, or infections. It may be said for sure, that according to most of the researches in the field shows the obvious interconnection between causes and types of aphasia and consequently manifestation of symptoms [4, p. 1].

A sudden onset of aphasia in an otherwise healthy adult is most likely to be vascular (ischemic stroke or intracerebral hemorrhage), although tumour, infection, or other lesion limited to a single vascular territory will often mimic the stroke syndrome.

There is a diagnosis problem with aphasia, dysarthria, and apraxia differentiation. The process can take a huge amount of crucially important time, taking into account such means as differentiation from other communication problems, bedside neurologic testing, neuropsychological testing, and brain imaging. The phenomenon of *apraxia* differs from aphasia with the fact that it is an impairment in the motor planning and programming of the speech articulators. In turn, *dysarthria* is an acquired disorder of speech production due to weakness, slowness, reduced range of movement, or impaired timing and coordination of the muscles of the jaw, lips, tongue, palate, vocal folds, and/or respiratory muscles (the speech articulators), that may cause a certain confusion diagnosing actual aphasia. So the issue is: can we shorten the amount of diagnosis time by using linguistic means only? For an attempt to answer this question one should explore kinds of symptoms manifestation and classifications in the framework of aphasia.

But first of all one should consider analyzing Aphasia Severity Rating (ASR), provided by the Aphasia Institute (USA):

0 – Speech, writing, and/or auditory comprehension are not functional. Any attempts to speak or use fluent utterances are not understandable to the listener OR the individual may not attempt to speak at all.

1 – The individual may occasionally produce words or phrases that are meaningful in context, but communication is fragmentary and not possible without significant help from the listener e.g. guessing, questioning. The conversation is very ‘one-sided’ with the listener bearing almost all of the burden. An extremely limited amount or range of information is exchanged. Misunderstandings or failed communications are very frequent.

2 – Basic conversation about most familiar or everyday topics is possible but significant break down occurs with more abstract or difficult conversations. The burden of conversation is not fully shared by the individual who experiences several instances of word-finding failures, paraphasias, and/or misunderstandings by the listener requiring the need for repair.

3 – Despite some observable issues related to speech fluency or comprehension, there is no significant limitation. The individual may hesitate to access words or self-correct during conversation but can share a significant portion of the burden of communication with the listener.

4 – Although the individual feels that he/she has a problem with language, this is barely apparent to the listener who may not detect any problem with speaking or understanding. [3, p. 1].

Considering all the above-mentioned levels of aphasia fluency, one can easily notice, that they refer to language features only, no physical or neurophysiological elements encountered.

And now several words about the typologies of aphasia. The most common classification of aphasia divides the disorder into clinical syndromes of frequently co-occurring deficits that reflect the vascular territory affected in stroke. For example, the Western aphasia battery and Boston diagnostic aphasia examination were designed to distinguish vascular syndromes. The relationship between the symptoms and the vascular territory that is affected is not always consistent but is more reliable acutely than chronically. What is remarkable, is the fact, that typological «*zoning*» is also being included in the *vascular* classification:

1. *Broca aphasia*.

Linguistic symptoms: nonfluent, poorly articulated, and agrammatic speech output (in both spontaneous speech and repetition) with relatively spared word comprehension. Individuals with Broca aphasia often have difficulty understanding syntactically complex or semantically reversible sentences but have little trouble understanding simple, semantically nonreversible sentences.

Neurophysiological symptoms: ischemia or other lesions in the left posterior inferior frontal cortex, in the distribution of the superior division of the left middle cerebral artery (MCA).

2. *Wernicke aphasia.*

Linguistic symptoms: fluent but meaningless speech output and repetition, with poor word and sentence comprehension.

Neurophysiological symptoms: ischemia in the posterior superior temporal cortex, in the distribution of the inferior division of the left MCA.

3. *Conduction aphasia*

Linguistic symptoms: disproportionately impaired repetition with otherwise fluent speech.

Neurophysiological symptoms: ischemia affecting the inferior parietal lobule.

4. *Transcortical aphasia.*

Linguistic symptoms: relatively spared repetition. Neurophysiological symptoms: ischemia involving the watershed area between the left MCA and left posterior cerebral artery territory.

For transcortical motor aphasia:

Neurophysiological symptoms: ischemia involving the watershed area between the left MCA and left anterior cerebral artery territory. Mixed transcortical aphasia results from ischemia in both of these "watershed" territories.

5. *Anomic aphasia*

Linguistic symptoms: impaired naming

Neurophysiological symptoms: tissue damage in the angular gyrus or posterior middle/inferior temporal cortex.

6. *Global aphasia*

Linguistic symptoms: denotes severe impairment in all aspects of language; Neurophysiological symptoms: the area of ischemia often involves both anterior and posterior language areas (Broca and Wernicke areas). [2, p. 23].

In this regard, considering all the above-enumerated categories and the fluency rate, one can make **the first conclusion**: aphasia can be diagnosed both with the help of the medical and linguistic means, but the level of perturbation can be defined with linguistic means only.

Now, one should ponder the following list of causes:

1. Rapid onset with poor nutrition will lead to suspicion of Wernicke's encephalopathy where it mimics aphasia.

2. Rapid-onset fluent aphasia with severe impairments in word meaning should be treated as herpes encephalitis until proven otherwise [2, p. 25].

3. Aphasia due to seizure or migraine may appear in patients with a history of epilepsy or migraine headaches.

4. Progression of aphasia over several weeks raises suspicion of Creutzfeldt-Jakob's disease.

5. Weight loss can be a sign of cancer or nutritional deficiency, raising the suspicion for tumour or Wernicke's encephalopathy.

6. Impairment of language over at least 2 years followed by the onset of other cognitive or behavioural deficits suggests a neurodegenerative disorder, such as Alzheimer's disease or primary progressive aphasia [1, p. 28].

Considering the above-mentioned points one can make **the second conclusion:** most of the aphasia types are being diagnosed through the identification of their neurophysiological manifestations, which is obvious. And the question once again is: is it possible to be done vice versa? In cases of severe functional physical damages, when the particular reasons for thinking and speech malfunctions are hard to be diagnosed – is that possible to define them judging by linguistic manifestations only? It is obvious, that such kind of research demands the analyses of an extremely wide selection of speech samples, behavioral patterns, and medical data taken from patients who have various manifestations of aphasia.

There is also a number of follow-up treatment measures to be taken. After identifying and treating the underlying cause of aphasia (an acute stroke or herpes encephalitis) patients may have a residual aphasia. Such aphasic individuals benefit from referral to a speech-language pathologist specializing in aphasia therapy. The process must be individualized to address residual deficits, communicative needs and priorities, and available resources. Therapy often addresses the impaired cognitive processes underlying the individual's altered performance of language

tasks. It is sometimes argued that intensive therapy (e.g., 5 days per week) is often more effective than less intensive therapy, unless the person can practice emerging skills on their own, often with the aid of a computer. However, the dose (number of sessions) may be more important than the intensity. Speech and language therapy can significantly improve functional communication, comprehension, and production of speech. Alternatively, caregivers can be trained by the speech-language pathologist to provide effective practice. Therapy might be augmented with medications, such as bromocriptine or dextroamphetamine, or with transcranial direct current stimulation, but larger randomized controlled trials are needed to determine whether these interventions have a significant benefit over speech and language therapy alone [3, p. 1].

Thus, one can turn now to the linguistic manifestations of aphasia. Aphasia involves one or more of the building blocks of language, phonemes, morphology, lexis, syntax, and semantics; and the deficits occur in various clusters or patterns across the spectrum. The degree of impairment varies across modalities, with written language often, but not always, more affected than spoken language. In some cases, understanding of language is relatively preserved, in others both production and understanding are affected. In addition to varied degrees of impairment in spoken and written language, any or more than one component of language can be affected. At the most severe end of the spectrum, a person with aphasia may be unable to communicate by either speech or writing and may be able to understand virtually nothing or only very limited social greetings. At the least severe end of the spectrum, the aphasic speaker may experience occasional word finding difficulties, often difficulties involving nouns; but unlike difficulties in recalling proper nouns in normal aging, word retrieval problems in mild aphasia includes other word classes. Descriptions of different clusters of language deficits have led to the notion of syndromes. Despite great variations in the condition, patterns of language deficits associated with different areas of brain damage have been influential in understanding language-brain relationships.

In this regard, increasing sophistication in language assessment and neurological investigations are contributing to a greater, yet still incomplete understanding of language-brain relationships. And now the article main idea is being disclosing: language-brain relationships

Given that different languages use different devices to mark certain features (e.g., word order, prepostpositions, affixes, or a combination of these), the same underlying deficit may cause different surface manifestations in different languages. Therefore, clinicians and researchers need to be aware of cross-linguistic symptoms, for at least three basic reasons:

- in the countries of the world where English is not a national language, patients ought not to be diagnosed based on data derived from English;
- immigration patterns around the world have created large numbers of speakers of languages other than English now living in traditionally English-speaking countries (e.g., in the United States alone, there are currently over 7.2 million persons born in Mexico, 1.1 million Filipinos, 1.1 million Chinese, 763,000 former nationals of the Soviet Union, over 600,000 Koreans, 600,000 Indians ard 600,000 Vietnamese, as estimated by the Census Bureau);

• to determine whether one of the languages of a bilingual or polyglot patient is recovered to a greater or lesser extent than the other language(s), once one becomes aware that the same underlying deficit may cause different surface manifestations in different languages, one must be able to interpret the patients' behavioural pattern in terms of its significance for each language.

Moreover, in cross-linguistic analyses possible aphasic symptoms are determined by the phonological and morphosyntactic structure of each type of language, the number of obligatory (as opposed to optional) contexts, the frequency of occurrence of items in the language and their semantic weight. The grammar (implicit linguistic competence) provides constraints (possible choices). Pragmatics selects among these available grammatical choices (languages, registers, indirect speech acts, figurative speech, syntactic constructions). Pathology limits the available choices, either in grammar (after a left-hemisphere lesion) or in pragmatics (after right-hemisphere damage). Therefore, the same underlying deficit may cause different surface manifestations in different languages. External societal and geopolitical factors may have a specific impact: bilingual populations may give rise to local dialects, diglossia, and/or code-mixing. Awareness of the characteristic symptoms in different languages is essential for clinicians and researchers in countries where English is not the national language, in countries with large numbers of immigrants, and in countries where bilingualism is inherent. By comparing symptoms of different languages, we should eventually be able to ascertain whether some deficits are caused by what is encoded (e.g., causality, negation, etc.) or by its linguistic means of implementation (e.g., lexical vs. inflectional causation) [1, p. 85].

Within the framework of specific professional language training or studies, especially language education for specialists engaged in medicine, three main conclusions of this work play a significant role. Also, speaking about practical approaches, learning medical terms can be drastically improved with the help of live analysis of cross-linguistic features within the field research among native speakers (surely taking into account professional specifics).

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